UNIVERSITI SAINS MALAYSIA

Second Semester Examination
Academic Session 2005/2006

April/Mei 2006

BBT 303E/3 – Plant Molecular Biology
[Biologi Molekul Tumbuhan]

Duration : 3 hours

[Masa: 3 jam]

Please ensure that this examination paper contains SIX printed pages before you begin the examination.

Answer FIVE out of SIX questions, in English or Bahasa Malaysia.

Each question carries 20 marks.

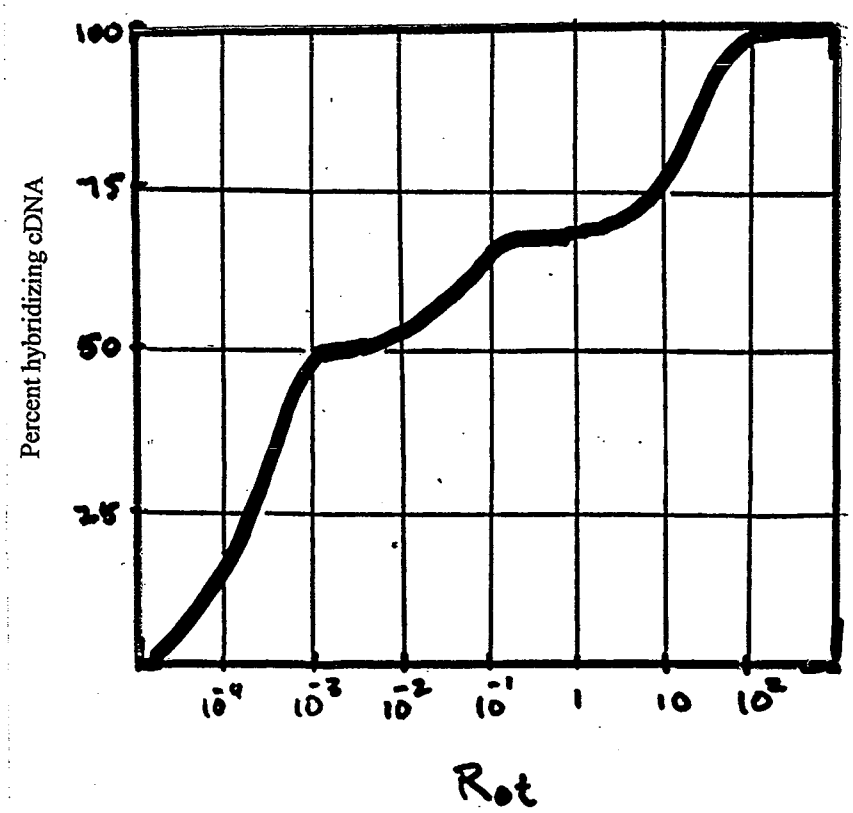
Sila pastikan bahawa kertas peperiksaan ini mengandungi ENAM muka surat yang bercetak sebelum anda memulakan peperiksaan ini.

Jawab LIMA daripada ENAM soalan yang diberikan dalam Bahasa Inggeris atau Bahasa Malaysia.

Tiap-tiap soalan bernilai 20 markah.

...2/-

2. The reassociation kinetics (R_ot curve) reaction of cDNA against excess mRNA is shown in the following:



The control is the hybridization of ovalbumin mRNA (length, 2000 base) to cDNA with an $R_ot_{1/2}$ of 0.0008. Assume a mass of 0.275 picograms of mRNA/cell.

[a] Calculate the complexity of each hybridizing component.

(9 marks)

[b] Calculate the number of mRNA species (average length, 2000 base) for each component.

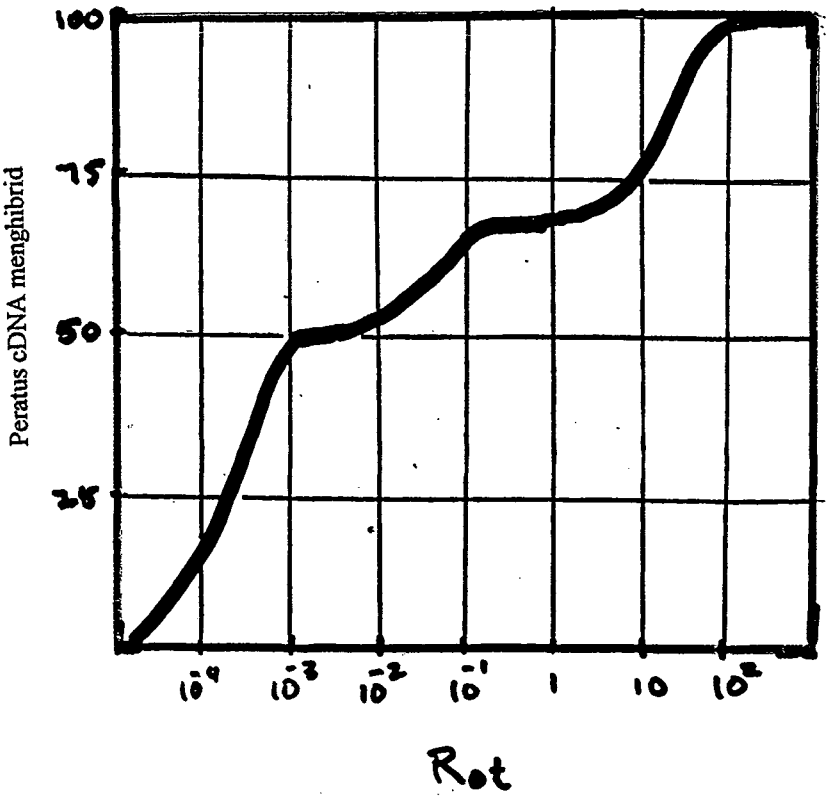
(2 marks)

[c] Calculate the abundance of each component.

(9 marks)

.../4-

2. *Kinetik pesekutuan semula (kelok R_ot tindakbalas mRNA berlebihan dengan cDNA ada seperti berikut.*



Penghibridan di antara mRNA ovalbumin (panjang 2000 bes) dan cDNA yang menghasilkan $R_ot_{1/2}$ 0.0008 dijadikan kawalan. Anggap jisim 0.275 picogram mRNA /sel.

[a] Hitungkan kekompleksan setiap satu komponen penghibridan.

(9 markah)

[b] Hitungkan bilangan spesies mRNA (panjang purata 2000 bes) setiap komponen.

(2 markah)

[c] Hitungkan kelimpahan setiap komponen.

(9 markah)

...5/-

3. [a] Stringency is an important factor during washing of Southern and Northern blots.

[i] Explain the term stringency.

(4 marks)

[ii] List and describe the three stringency conditions.

(6 marks)

[b] Explain how the removal of a hair-pin region in an RNA molecule will result in mobility being inversely proportional to the log. of the molecular weight.

(10 marks)

3. [a] Keketatan adalah suatu faktor penting semasa pembasuhan blot Southern dan Northern.

[i] Terangkan keketatan. (4 markah)

[ii] Senaraikan dan huraikan tiga keadaan keketatan.

(6 markah)

[b] Pembasmian kawasan pin-rambut molekul RNA akan menyebabkan kemobilan berkadar songsang kepada log. berat molekul. Terangkan .

(10 markah)

4. Describe with the aid of a schematic diagram the process of non-cyclic photophosphorylation taking into consideration the relative redox potential value of each component.

(20 marks)

4. Huraikan dengan bantuan gambarajah skema proses pemfotofosrilan bukan siklik dengan mengambilkira nilai relatif keupayaan redoks setiap komponen.

(20 markah)

...6/-

5. [a] Give a summary of membrane functions in a plant cell.

(10 marks)

[b] Describe the cell wall and the function of plasmodesmata.

(10 marks)

5. *[a] Beri satu ringkasan fungsi membran dalam sel tumbuhan.*

(10 markah)

[b] Huraikan dinding sel dan fungsi plasmodesmata.

(10 markah)

6. Explain the genetic basis of flowering in plants using *Arabidopsis* as a model.

(20 marks)

6. *Terangkan asas genetik pembungaan dalam tumbuhan menggunakan Arabidopsis sebagai model.*

(20 markah)

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